PATENT ABSTRACTS OF JAPAN

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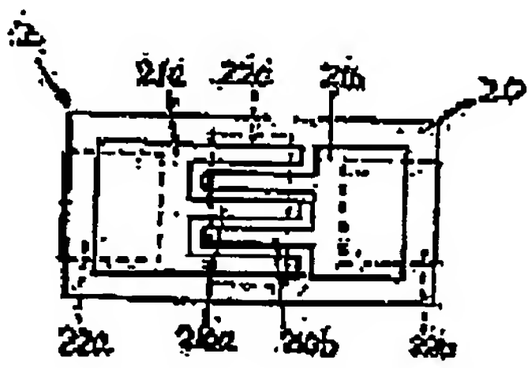
(54) DIELECTRIC FILTER

(57)Abstract

PURPOSE: To provide the filter with which the fluctuation of basic characteristics is reduced even when the thickness of dielectric constant of a capacity coupling substrate is dispersed.

CONSTITUTION: Concerning the dielectric filter composed of a filter part joining plural resonating means and a capacity coupling substrate forming a capacity circuit for coupling the resonating means, plural pieces of first capacity electrode patterns 21a and 21b to be connected with the inner conductors of the resonating means are formed on the surface of the capacity coupling substrate to be connected with the filter part. Then, the first capacity electrodes 21a and 21b to be connected to the resonating means to be coupled are provided with comb-line electrode parts 210a and 210b to be engaged each other. Further, on the rear surface of the capacity coupling substrate 2, second capacity electrode patterns 22a and 22b are formed at the positions faced to the first capacity electrode patterns 21a and 21b to be connected to the resonating means for input/output, and a third capacity electrode pattern 22c formed at the position corresponding to the comb-line electrode parts 210a and 210b of the first capacity electrode patterns 21a and 21b to be engaged each other.



* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1]Have a radiation electrode, an earth electrode, and a feed electrode which are provided in the surface of a base which consists of a dielectric or a magnetic body, and this base, one end of said radiation electrode forms an open end, and it is connected to said earth electrode by the other end, and An open end of said radiation electrode, A surface mounted type antenna establishing a frequency means for switching for an end of said feed electrode to change an inductance component or a capacity component, and switch resonance frequency on the surface of said base in a surface mounted type antenna which it comes to arrange by approaching mutually.
[Claim 2]The 1st track where said radiation electrode consists of a microstrip line of said base provided in the principal surface on the other hand, Comprise the 2nd track and the 3rd track, and an end of said 1st track forms an open end, and an end of said 2nd track, It is arranged near the other end of said 1st track, and said 3rd track, It is formed in one succeeding said 2nd track, and said earth electrode, It is provided in the another side principal surface of said base, and said frequency means for switching, The surface mounted type antenna according to claim 1 provided with a semiconductor device which consists of a chip connected to the other end of said 1st track, and one end of said 2nd track, and a switching electrode for switching and impressing voltage of a predetermined field to this semiconductor device.
[Claim 3]Said radiation electrode consists of striplines and said earth electrode, Approach an open end of said radiation electrode, and consist of the 1st earth electrode and 2nd earth electrode that are mutually formed in a different body, and an end of said 1st earth electrode is arranged, and said 2nd earth electrode, It is formed in one succeeding said some of radiation electrodes, and said frequency means for switching, The surface mounted type antenna according to claim 1 provided with a variable capacity element which consists of a chip connected to an open end of said 1st earth electrode and said radiation electrode, and a switching electrode for switching and impressing voltage of a predetermined field to this variable capacity element.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to mobile communications equipment, such as a cellular phone, and the surface mounted type antenna used for wireless LAN.
[0002]
[Description of the Prior Art]As a conventional surface mounted type antenna, what was indicated by JP,H9-98015,A is taken for an example, and the composition is explained using drawing 9.
[0003]In drawing 9, 41 is a surface mounted type antenna and it comes to form the radiation electrode 43, the earth electrode 44, and the feed electrode 45 which consist of microstrip lines in the surface of the base 42 which consists of a dielectric or a magnetic body. Here, one end of the radiation electrode 43 is connected to the earth electrode 44 of the base 42 which, on the other hand, formed the open end 43a in the principal surface 42a, and the other end was prolonged in the another side principal surface 42b of the base 42, and was formed in the field. In the one side principal surface 42a of the base 42, the end of the feed electrode 45 approaches the open end 43a of the radiation electrode 43, and is arranged. The other end of the feed electrode 45 is prolonged in the another side principal surface 42b of the base 42, and is electrically insulated from the earth electrode 44 by being arranged via the base of the base 42 to the earth electrode 44. Next, operation of the surface mounted type antenna 41 constituted in this way is explained using drawing 10.
[0004]In drawing 10, the capacity which generates f1 in a high frequency signal source, and generates C10 between the open end 43a of the radiation electrode 43 and the feed electrode 45, the microstrip line from which L6 constitutes the radiation electrode 43, and R3 are radiation resistance. Here, with the capacity C10, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 45 from the high frequency signal source f1 is carried out to the radiation electrode 43, it serves as an electric wave, and is emitted.
[0005]
[Problem(s) to be Solved by the Invention]However, in the conventional surface mounted type antenna 41, since resonance frequency was specified mainly with the linear dimension and width dimension of the dielectric constant of the dielectric or magnetic body which constitutes the base 42, and the radiation electrode 43, there was a problem that two or more resonance frequency was not obtained.
[0006]Then, it aims at providing the surface mounted type antenna with which two or more resonance frequency is obtained in this invention.
[0007]
[Means for Solving the Problem]In [in order to attain the above-mentioned purpose] this invention, Have a radiation electrode, an earth electrode, and a feed electrode which are provided in the surface of a base which consists of a dielectric or a magnetic body, and this base, one end of said radiation electrode forms an open end, and it is connected to said earth electrode by the other end, and An open end of said radiation electrode, A frequency means for switching for an end of said feed electrode to change an inductance component or a capacity component, and switch resonance frequency on the surface of said base, in a surface mounted type antenna which it comes to arrange by approaching mutually, was established.
[0008]Said radiation electrode comprises the 1st track, the 2nd track, and the 3rd track where said base this

invention consists of a microstrip line provided in the principal surface on the other hand, an end of said 1st track forms an open end, and it is characterized by an end of said 2nd track comprising the following.
It is arranged near the other end of said 1st track, and said 3rd track, A semiconductor device which it is formed in one succeeding said 2nd track, said earth electrode is provided in the another side principal surface of said base, and said frequency means for switching becomes from a chip connected to the other end of said 1st track, and one end of said 2nd track.
A switching electrode for switching and impressing voltage of a predetermined field to this semiconductor device.

[0009]Said radiation electrode consists of striplines and said earth electrode, The 1st this invention mutually formed in a different body consists of an earth electrode and the 2nd earth electrode, an end of said 1st earth electrode approaches an open end of said radiation electrode, and is arranged, and it is characterized by said 2nd earth electrode comprising the following.
A variable capacity element which it is formed in one succeeding said some of radiation electrodes, and said frequency means for switching becomes from a chip connected to an open end of said 1st earth electrode and said radiation electrode.
A switching electrode for switching and impressing voltage of a predetermined field to this variable capacity element.

[0010]A semiconductor device can be made to turn on and off in a surface mounted type antenna concerning this invention by switching voltage of a predetermined field and being impressed by a semiconductor device from the exterior, via a switching electrode which constitutes a frequency means for switching. And at the time of OFF of a semiconductor device, the 1st thru/or the 3rd track which constitutes a radiation electrode will flow mutually, and only the 1st and 2nd tracks will flow mutually at the time of one of a semiconductor device. Thus, by switching OFF/OFF of a semiconductor device, a linear dimension of a portion actually used among radiation electrodes can be changed, and an inductance component which specifies resonance frequency of an antenna can be adjusted. Thereby, two or more resonance frequency is realizable.
[0011]In a surface mounted type antenna concerning this invention, capacity of a variable capacity element can be changed from the exterior by switching voltage of a predetermined field and being impressed by a variable capacity element via a switching electrode which constitutes a frequency means for switching. A capacity component which specifies resonance frequency of an antenna can be changed by this, and two or more resonance frequency can be realized.
[0012]In a surface mounted type antenna concerning this invention, since a frequency means for switching is established on the surface of a base, the surface mounted type antenna does not need to establish a frequency means for switching of a different body, and contributes it to a miniaturization of the whole device provided with a surface mounted type antenna.
[0013]
[Embodiment of the Invention]The composition of the surface mounted type antenna concerning the 1st working example of this invention is explained using drawing 1.
[0014]In drawing 1, 1 is a surface mounted type antenna and forms the radiation electrode 3, the earth electrode 4, the feed electrode 5, and the frequency means for switching 6 in the surface of the base 2 which fabricates dielectrics, such as Ceramics Sub-Division and resin, to rectangular parallelepiped shape. The base 2 may consist of a magnetic body instead of a dielectric.
[0015]Here, the radiation electrode 3 comprises the 1st track 3a, the 2nd track 3b, and the 3rd track 3c which consist of a microstrip line of the base 2 mutually formed in a different body on the other hand in the principal surface 2a. Among these, one end of the 1st track 3a forms the open end three a1, and the extended part three a2 of the base 2 prolonged in the approximately center of the principal surface 2a on the other hand is formed in the other end. The 2nd track 3b is arranged on extension of the 1st track 3a, and one end is close to the other end of the 1st track 3a. The other end of the 2nd track 3b is prolonged in another side principal surface 2b via the end face 2c of the base 2. The 3rd track 3c has the extended part 3c1, and is formed in the 2nd track 3b and one in succession near the end of the 2nd track 3b via this extended part 3c1.

[0016]The earth electrode 4 is formed all over almost [of another side principal surface 2b of the base 2], and is formed in the 2nd track 3b and one succeeding the other end of the 2nd track 3b of the radiation electrode 3.
[0017]The feed electrode 5 covers the one side principal surface 2a, 2d of end faces, and another side principal surface 2b of the base 2, and is formed in roughly U-shape. The end of the feed electrode 5 is close to the open end three a1 of the radiation electrode 3 in the one side principal surface 2a of the base 2. The other end is electrically insulated from the earth electrode 4 by being arranged via the base of the base 2 to the earth electrode 4 in another side principal surface 2b of the base 2.
[0018]The frequency means for switching 6 consists of the switching electrode 7, the resistance 8 for chalk, the diode 9 as a semiconductor device, and the capacitor 10 for a bypass. Among these, the resistance 8, the diode 9, and the capacitor 10 consist of chips, respectively. Elements, such as a transistor or FET, may be used as a semiconductor device in addition to a diode.
[0019]Here, the switching electrode 7 is electrically insulated from the earth electrode 4 by [of the base 2] resulting in another side principal surface 2b via the side 2e of the base 2, and on the other hand, being arranged via the base of the base 2 to the earth electrode 4 from about three a1 open end of the radiation electrode 3 on the principal surface 2a. The resistance 8 has been arranged between the switching electrodes 7 the open end three a1 side of the 1st track 3a of the radiation electrode 3, and has connected the 1st track 3a and switching electrode 7. The diode 9 has been arranged between the 1st and 2nd track 3a that constitutes the radiation electrode 3, and 3b, and has connected these two tracks. The capacitor 10 has been arranged between the extended part three a2 of the 1st track 3a, and the 3rd track 3c, and has connected these two tracks.
[0020]It is mounted in a circuit wiring board, the switching electrode 7 is connected to the voltage control mechanism of a set side, and especially the surface mounted type antenna 1 constituted in this way is used, although not illustrated.
[0021]Next, operation of the surface mounted type antenna 1 is explained using drawing 2.
[0022]In drawing 2, f is a high frequency signal source and the capacity which generates C1 between the open end three a1 of the radiation electrode 3 and the feed electrode 5, the capacity which generates C2 between the earth electrode 4 and the feed electrode 5, and C3 are capacity generated between the open end three a1 of the 1st track 3a of the radiation electrode 3, and the earth electrode 4. R1 is resistance by the resistance 8, and C4 is the capacity by the capacitor for a bypass (not shown) formed on the circuit wiring board in which the surface mounted type antenna 1 is mounted. L1, L2, and L3 are microstrip lines which constitute the 1st thru/or the 3rd track 3a, 3b, and 3c, respectively, and C5 is the capacity by the capacitor 10. The 3rd track 3c is connected between the 1st and 2nd track 3a and 3b, and the diode 9 which constitutes the frequency means for switching 6 is connected in parallel to the diods 9 while being connected in series between the 1st and 2nd track 3a and 3b. And with the capacity C1, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 5 from the high frequency signal source f is carried out to the radiation electrode 3, it serves as an electric wave, and is emitted.
[0023]Here, the diode 9 turns on and off by impressing voltage to the diode 9 and adjusting the value of this input voltage from the voltage control mechanism (not shown) of a set side, via the switching electrode 7 which constitutes the frequency means for switching 6 of the surface mounted type antenna 1. At the time of OFF of the diode 9, the 1st thru/or the 3rd track 3a, 3b, and 3c which constitute the radiation electrode 3 flow mutually, and the inductance component of the surface mounted type antenna 1 is formed of the microstrip lines L1 thru/or L3. On the other hand, at the time of one of the diode 9, only the 1st track 3a and 2nd track 3b flow, and the inductance component of the surface mounted type antenna 1 is formed of the microstrip lines L1 and L2. Thus, two or more resonance frequency is realizable by making the diode 9 turn on and off and changing the inductance component which specifies the resonance frequency of an antenna.
[0024]The shape of each electrode provided in the surface of the base 2, each electrode, and arrangement of each chip are not limited to what was shown in above-mentioned working example, unless these each inter-electrode one or the connecting relation of each electrode and each chip is changed. For example, as shown in drawing 3, in 2 d of end faces of the base 2, the placed opposite of the 1st open end three a1 and feed electrode 5 of the track 3a of the radiation electrode 3 may be carried out. As shown in drawing 4, the formation position [in / according to the shape of the 1st track 3a / while making it crooked in the shape of a right angle on the principal surface 2a on the other hand / the feed electrode 5, the switching electrode 7, and the base 2 of the resistance 8] of the base 2 may

be changed for the 1st track 3a of the radiation electrode 3.
[0025]Next, the composition of the surface mounted type antenna concerning the 2nd working example of this invention is explained using drawing 5. The same numerals are given to the portion which is the same as that of the 1st working example, or corresponds, and the explanation is omitted.
[0026]In drawing 5, 21 is a surface mounted type antenna and forms the radiation electrode 23, the earth electrode 24, the feed electrode 25, and the frequency means for switching 26 in the surface of the base 2.
[0027]Here, the radiation electrode 23 consists of the 1st radiation electrode 23a and 2nd radiation electrode 23b. Among these, one end of the 1st radiation electrode 23a formed the open end 23a1 [near / which, on the other hand, touches the end face 2c of the principal surface 2a / the edge of the base 2], and the other end is prolonged to near the approximately center of the edge which, on the other hand, touches 2 f of sides of the principal surface 2a. The placed opposite of the one end is carried out to the other end of the 1st radiation electrode 23a, the 2nd radiation electrode 23b was crooked in the shape of an abbreviated L character in the one side principal surface 2a of the base 2, and the other end is prolonged on the side 2e. The earth electrode 24 consists of the 1st earth electrode 24a and 2nd earth electrode 24b. Among these, one end of the 1st earth electrode 24a approaches the open end 23a1 of the 1st radiation electrode 23a of the base 2 that constitutes the radiation electrode 23 in the principal surface 2a on the other hand, and is arranged, and the other end is prolonged to another side principal surface 2b via the side 2e of the base 2. The 2nd earth electrode 24b was formed in the side 2e of the base 2, one end was connected to the 2nd radiation electrode 23b that constitutes the radiation electrode 23, and the other end is prolonged to another side principal surface 2b of the base 2.
[0028]The feed electrode 25 adjoins from the earth electrode 24 at inner direction slippage of the base 2 at the earth electrode 24, it is formed, one end has been arranged at about 23a1 open end of the radiation electrode 23 of the one side principal surface 2a of the base 2, and the other end is prolonged to another side principal surface 2b via the side 2e.
[0029]The frequency means for switching 26 consists of the switching electrode 27, the resistance 28 for chalk, the variable capacitance diode 29 as a variable capacity element, and the capacitor 30 for DC cut. Among these, the resistance 28, the variable capacitance diode 29, and the capacitor 30 consist of chips, respectively. Elements other than variable capacitance diode may be used as a variable capacity element.
[0030]Here, the switching electrode 27 consisted of the 1st switching electrode 27a and 2nd switching electrode 27b, among these one end of the 1st switching electrode 27a has been arranged in the approximately center of the one side principal surface 2a of the base 2, and the other end is prolonged to another side principal surface 2b via the side 2e of the base 2. It is formed on extension of the 1st switching electrode 27a, the placed opposite of the one end is carried out to one end of the 1st switching electrode 27a, and the 2nd switching electrode 27b is connected to the 1st radiation electrode 23a in which the other end constitutes the radiation electrode 23. The resistance 28 has been arranged between the 1st switching electrode 27a that constitutes the switching electrode 27, and the 2nd switching electrode 27b, and has connected the 1st switching electrode 27a and 2nd switching electrode 27b. The variable capacitance diode 29 has been arranged between the open end 23a1 of the radiation electrode 23, and the end of the 1st earth electrode 24a that constitutes the earth electrode 24, and has connected the radiation electrode 23 and the earth electrode 24. The capacitor 30 has been arranged between the other end of the 1st radiation electrode 23a that constitutes the radiation electrode 23, and one end of the 2nd radiation electrode 23b, and has connected the 1st radiation electrode 23a and 2nd radiation electrode 23b.
[0031]It is mounted in a circuit wiring board, the 1st switching electrode 27a that constitutes the switching electrode 27 is connected to the voltage control mechanism of a set side, and especially the surface mounted type antenna 21 constituted in this way is used, although not illustrated.
[0032]Next, operation of the surface mounted type antenna 21 is explained using drawing 6.
[0033]In drawing 6, f is a high frequency signal source and the capacity which generates C6 between the open end 23a1 of the radiation electrode 23 and the feed electrode 25, and C7 are capacity generated between the open end 23a1 of the radiation electrode 23, and the earth electrode 24. VC is the variable capacity by the variable capacitance diode 29. R2 is resistance by the resistance 28, and C8 is the capacity by the capacitor for a bypass (not shown) formed on the circuit wiring board in which the surface mounted type antenna 21 is mounted. L4 is the inductance by the 1st radiation electrode 23a, and the inductance according [L5] to the 2nd radiation electrode

23b, and C9 is the capacity by the capacitor 30. And with the capacity C6, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 25 from the high frequency signal source f is carried out to the radiation electrode 23, it serves as an electric wave, and is emitted.

[0034]Here, the capacity by the variable capacitance diode 29 fluctuates by impressing voltage to the variable capacitance diode 29, and adjusting the value of this input voltage from the voltage control mechanism of a set side, via the switching electrode 27 which constitutes the frequency means for switching 26 of the surface mounted type antenna 21. Thus, two or more resonance frequency is realizable by changing the capacity component which specifies the resonance frequency of an antenna.

[0035]The shape of each electrode provided in the surface of the base 2, each electrode, and arrangement of each chip are not limited to what was shown in above-mentioned working example, unless these each inter-electrode one or the connecting relation of each electrode and each chip is changed. For example, as shown in drawing 7, while arranging the capacitor 30 on 2 f of sides of the base 2, each electrode may be made to extend on 2 f of sides. As shown in drawing 8, the end face 2c of the base 2 may be detoured, and the 1st radiation electrode 23a may be formed.

[0036]

[Effect of the Invention]A semiconductor device can be made to turn on and off in the surface mounted type antenna concerning this invention by switching the voltage of a predetermined field and being impressed by a semiconductor device from the exterior, via the switching electrode which constitutes a frequency means for switching. And at the time of OFF of a semiconductor device, the 1st thru/or the 3rd track which constitutes a radiation electrode will flow mutually, and only the 1st and 2nd tracks will flow mutually at the time of one of a semiconductor device. Thus, by switching OFF/OFF of a semiconductor device, the linear dimension of the portion actually used among radiation electrodes can be changed, and the inductance component which specifies the resonance frequency of an antenna can be adjusted. Thereby, the surface mounted type antenna which has two or more resonance frequency can be provided.

[0037]In the surface mounted type antenna concerning this invention, the capacity of a variable capacity element can be changed from the exterior by switching the voltage of a predetermined field and being impressed by a variable capacity element via the switching electrode which constitutes a frequency means for switching. The capacity component which specifies the resonance frequency of an antenna can be changed by this, and the surface mounted type antenna which has two or more resonance frequency can be provided.

[0038]In the surface mounted type antenna concerning this invention, since the frequency means for switching is established on the surface of the base, the surface mounted type antenna does not need to establish the frequency means for switching of a different body, and contributes it to the miniaturization of the whole device provided with a surface mounted type antenna.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention relates to mobile communications equipment, such as a cellular phone, and the surface mounted type antenna used for wireless LAN.

[Translation done.]

PRIOR ART

[Description of the Prior Art]As a conventional surface mounted type antenna, what was indicated by JP,H9-98015,A is taken for an example, and the composition is explained using drawing 9.
[0003]In drawing 9, 41 is a surface mounted type antenna and it comes to form the radiation electrode 43, the earth electrode 44, and the feed electrode 45 which consist of microstrip lines in the surface of the base 42 which consists of a dielectric or a magnetic body. Here, one end of the radiation electrode 43 is connected to the earth electrode 44 of the base 42 which, on the other hand, formed the open end 43a in the principal surface 42a, and the other end was prolonged in the another side principal surface 42b of the base 42, and was formed in the field. In the one side principal surface 42a of the base 42, the end of the feed electrode 45 approaches the open end 43a of the radiation electrode 43, and is arranged. The other end of the feed electrode 45 is prolonged in the another side principal surface 42b of the base 42, and is electrically insulated from the earth electrode 44 by being arranged via the base of the base 42 to the earth electrode 44. Next, operation of the surface mounted type antenna 41 constituted in this way is explained using drawing 10.
[0004]In drawing 10, the capacity which generates f1 in a high frequency signal source, and generates C10 between the open end 43a of the radiation electrode 43 and the feed electrode 45, the microstrip line from which L6 constitutes the radiation electrode 43, and R3 are radiation resistance. Here, with the capacity C10, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 45 from the high frequency signal source f1 is carried out to the radiation electrode 43, it serves as an electric wave, and is emitted.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]A semiconductor device can be made to turn on and off in the surface mounted type antenna concerning this invention by switching the voltage of a predetermined field and being impressed by a semiconductor device from the exterior, via the switching electrode which constitutes a frequency means for switching. And at the time of OFF of a semiconductor device, the 1st thru/or the 3rd track which constitutes a radiation electrode will flow mutually, and only the 1st and 2nd tracks will flow mutually at the time of one of a semiconductor device. Thus, by switching OFF/OFF of a semiconductor device, the linear dimension of the portion actually used among radiation electrodes can be changed, and the inductance component which specifies the resonance frequency of an antenna can be adjusted. Thereby, the surface mounted type antenna which has two or more resonance frequency can be provided.

[0037]In the surface mounted type antenna concerning this invention, the capacity of a variable capacity element can be changed from the exterior by switching the voltage of a predetermined field and being impressed by a variable capacity element via the switching electrode which constitutes a frequency means for switching. The capacity component which specifies the resonance frequency of an antenna can be changed by this, and the surface mounted type antenna which has two or more resonance frequency can be provided.

[0038]In the surface mounted type antenna concerning this invention, since the frequency means for switching is established on the surface of the base, the surface mounted type antenna does not need to establish the frequency means for switching of a different body, and contributes it to the miniaturization of the whole device provided with a surface mounted type antenna.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in the conventional surface mounted type antenna 41, since resonance frequency was specified mainly with the linear dimension and width dimension of the dielectric constant of the dielectric or magnetic body which constitutes the base 42, and the radiation electrode 43, there was a problem that two or more resonance frequency was not obtained.
[0006]Then, it aims at providing the surface mounted type antenna with which two or more resonance frequency is obtained in this invention.

[Translation done.]

MEANS

[Means for Solving the Problem]In [in order to attain the above-mentioned purpose] this invention, Have a radiation electrode, an earth electrode, and a feed electrode which are provided in the surface of a base which consists of a dielectric or a magnetic body, and this base, one end of said radiation electrode forms an open end, and it is connected to said earth electrode by the other end, and An open end of said radiation electrode, A frequency means for switching for an end of said feed electrode to change an inductance component or a capacity component, and switch resonance frequency on the surface of said base, in a surface mounted type antenna which it comes to arrange by approaching mutually, was established.
[0008]Said radiation electrode comprises the 1st track, the 2nd track, and the 3rd track where said base this invention consists of a microstrip line provided in the principal surface on the other hand, an end of said 1st track forms an open end, and it is characterized by an end of said 2nd track comprising the following.
It is arranged near the other end of said 1st track, and said 3rd track, A semiconductor device which it is formed in one succeeding said 2nd track, said earth electrode is provided in the another side principal surface of said base, and said frequency means for switching becomes from a chip connected to the other end of said 1st track, and one end of said 2nd track.
A switching electrode for switching and impressing voltage of a predetermined field to this semiconductor device.

[0009]Said radiation electrode consists of striplines and said earth electrode, The 1st this invention mutually formed in a different body consists of an earth electrode and the 2nd earth electrode, an end of said 1st earth electrode approaches an open end of said radiation electrode, and is arranged, and it is characterized by said 2nd earth electrode comprising the following.
A variable capacity element which it is formed in one succeeding said some of radiation electrodes, and said frequency means for switching becomes from a chip connected to an open end of said 1st earth electrode and said radiation electrode.
A switching electrode for switching and impressing voltage of a predetermined field to this variable capacity element.

[0010]A semiconductor device can be made to turn on and off in a surface mounted type antenna concerning this invention by switching voltage of a predetermined field and being impressed by a semiconductor device from the exterior, via a switching electrode which constitutes a frequency means for switching. And at the time of OFF of a semiconductor device, the 1st thru/or the 3rd track which constitutes a radiation electrode will flow mutually, and only the 1st and 2nd tracks will flow mutually at the time of one of a semiconductor device. Thus, by switching OFF/OFF of a semiconductor device, a linear dimension of a portion actually used among radiation electrodes can be changed, and an inductance component which specifies resonance frequency of an antenna can be adjusted. Thereby, two or more resonance frequency is realizable.
[0011]In a surface mounted type antenna concerning this invention, capacity of a variable capacity element can be changed from the exterior by switching voltage of a predetermined field and being impressed by a variable capacity element via a switching electrode which constitutes a frequency means for switching. A capacity component which specifies resonance frequency of an antenna can be changed by this, and two or more resonance frequency can be

realized.
[0012]In a surface mounted type antenna concerning this invention, since a frequency means for switching is established on the surface of a base, the surface mounted type antenna does not need to establish a frequency means for switching of a different body, and contributes it to a miniaturization of the whole device provided with a surface mounted type antenna.
[0013]
[Embodiment of the Invention]The composition of the surface mounted type antenna concerning the 1st working example of this invention is explained using drawing 1.
[0014]In drawing 1, 1 is a surface mounted type antenna and forms the radiation electrode 3, the earth electrode 4, the feed electrode 5, and the frequency means for switching 6 in the surface of the base 2 which fabricates dielectrics, such as Ceramics Sub-Division and resin, to rectangular parallelepiped shape. The base 2 may consist of a magnetic body instead of a dielectric.
[0015]Here, the radiation electrode 3 comprises the 1st track 3a, the 2nd track 3b, and the 3rd track 3c which consist of a microstrip line of the base 2 mutually formed in a different body on the other hand in the principal surface 2a. Among these, one end of the 1st track 3a forms the open end three a1, and the extended part three a2 of the base 2 prolonged in the approximately center of the principal surface 2a on the other hand is formed in the other end. The 2nd track 3b is arranged on extension of the 1st track 3a, and one end is close to the other end of the 1st track 3a. The other end of the 2nd track 3b is prolonged in another side principal surface 2b via the end face 2c of the base 2. The 3rd track 3c has the extended part 3c1, and is formed in the 2nd track 3b and one in succession near the end of the 2nd track 3b via this extended part 3c1.
[0016]The earth electrode 4 is formed all over almost [of another side principal surface 2b of the base 2], and is formed in the 2nd track 3b and one succeeding the other end of the 2nd track 3b of the radiation electrode 3.
[0017]The feed electrode 5 covers the one side principal surface 2a, 2d of end faces, and another side principal surface 2b of the base 2, and is formed in roughly U-shape. The end of the feed electrode 5 is close to the open end three a1 of the radiation electrode 3 in the one side principal surface 2a of the base 2. The other end is electrically insulated from the earth electrode 4 by being arranged via the base of the base 2 to the earth electrode 4 in another side principal surface 2b of the base 2.
[0018]The frequency means for switching 6 consists of the switching electrode 7, the resistance 8 for chalk, the diode 9 as a semiconductor device, and the capacitor 10 for a bypass. Among these, the resistance 8, the diode 9, and the capacitor 10 consist of chips, respectively. Elements, such as a transistor or FET, may be used as a semiconductor device in addition to a diode.
[0019]Here, the switching electrode 7 is electrically insulated from the earth electrode 4 by [of the base 2] resulting in another side principal surface 2b via the side 2e of the base 2, and on the other hand, being arranged via the base of the base 2 to the earth electrode 4 from about three a1 open end of the radiation electrode 3 on the principal surface 2a. The resistance 8 has been arranged between the switching electrodes 7 the open end three a1 side of the 1st track 3a of the radiation electrode 3, and has connected the 1st track 3a and switching electrode 7. The diode 9 has been arranged between the 1st and 2nd track 3a that constitutes the radiation electrode 3, and 3b, and has connected these two tracks. The capacitor 10 has been arranged between the extended part three a2 of the 1st track 3a, and the 3rd track 3c, and has connected these two tracks.
[0020]It is mounted in a circuit wiring board, the switching electrode 7 is connected to the voltage control mechanism of a set side, and especially the surface mounted type antenna 1 constituted in this way is used, although not illustrated.
[0021]Next, operation of the surface mounted type antenna 1 is explained using drawing 2.
[0022]In drawing 2, f is a high frequency signal source and the capacity which generates C1 between the open end three a1 of the radiation electrode 3 and the feed electrode 5, the capacity which generates C2 between the earth electrode 4 and the feed electrode 5, and C3 are capacity generated between the open end three a1 of the 1st track 3a of the radiation electrode 3, and the earth electrode 4. R1 is resistance by the resistance 8, and C4 is the capacity by the capacitor for a bypass (not shown) formed on the circuit wiring board in which the surface mounted type antenna 1 is mounted. L1, L2, and L3 are microstrip lines which constitute the 1st thru/or the 3rd track 3a, 3b, and 3c, respectively, and C5 is the capacity by the capacitor 10. The 3rd track 3c is connected between the 1st and

2nd track 3a and 3b, and the diode 9 which constitutes the frequency means for switching 6 is connected in parallel to the diode 9 while being connected in series between the 1st and 2nd track 3a and 3b. And with the capacity C1, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 5 from the high frequency signal source f is carried out to the radiation electrode 3, it serves as an electric wave, and is emitted.
[0023]Here, the diode 9 turns on and off by impressing voltage to the diode 9 and adjusting the value of this input voltage from the voltage control mechanism (not shown) of a set side, via the switching electrode 7 which constitutes the frequency means for switching 6 of the surface mounted type antenna 1. At the time of OFF of the diode 9, the 1st thru/or the 3rd track 3a, 3b, and 3c which constitute the radiation electrode 3 flow mutually, and the inductance component of the surface mounted type antenna 1 is formed of the microstrip lines L1 thru/or L3. On the other hand, at the time of one of the diode 9, only the 1st track 3a and 2nd track 3b flow, and the inductance component of the surface mounted type antenna 1 is formed of the microstrip lines L1 and L2. Thus, two or more resonance frequency is realizable by making the diode 9 turn on and off and changing the inductance component which specifies the resonance frequency of an antenna.
[0024]The shape of each electrode provided in the surface of the base 2, each electrode, and arrangement of each chip are not limited to what was shown in above-mentioned working example, unless these each inter-electrode one or the connecting relation of each electrode and each chip is changed. For example, as shown in drawing 3, in 2 d of end faces of the base 2, the placed opposite of the 1st open end three a1 and feed electrode 5 of the track 3a of the radiation electrode 3 may be carried out. As shown in drawing 4, the formation position [in / according to the shape of the 1st track 3a / while making it crooked in the shape of a right angle on the principal surface 2a on the other hand / the feed electrode 5, the switching electrode 7, and the base 2 of the resistance 8] of the base 2 may be changed for the 1st track 3a of the radiation electrode 3.
[0025]Next, the composition of the surface mounted type antenna concerning the 2nd working example of this invention is explained using drawing 5. The same numerals are given to the portion which is the same as that of the 1st working example, or corresponds, and the explanation is omitted.
[0026]In drawing 5, 21 is a surface mounted type antenna and forms the radiation electrode 23, the earth electrode 24, the feed electrode 25, and the frequency means for switching 26 in the surface of the base 2.
[0027]Here, the radiation electrode 23 consists of the 1st radiation electrode 23a and 2nd radiation electrode 23b. Among these, one end of the 1st radiation electrode 23a formed the open end 23a1 [near / which, on the other hand, touches the end face 2c of the principal surface 2a / the edge of the base 2], and the other end is prolonged to near the approximately center of the edge which, on the other hand, touches 2 f of sides of the principal surface 2a. The placed opposite of the one end is carried out to the other end of the 1st radiation electrode 23a, the 2nd radiation electrode 23b was crooked in the shape of an abbreviated L character in the one side principal surface 2a of the base 2, and the other end is prolonged on the side 2e. The earth electrode 24 consists of the 1st earth electrode 24a and 2nd earth electrode 24b. Among these, one end of the 1st earth electrode 24a approaches the open end 23a1 of the 1st radiation electrode 23a of the base 2 that constitutes the radiation electrode 23 in the principal surface 2a on the other hand, and is arranged, and the other end is prolonged to another side principal surface 2b via the side 2e of the base 2. The 2nd earth electrode 24b was formed in the side 2e of the base 2, one end was connected to the 2nd radiation electrode 23b that constitutes the radiation electrode 23, and the other end is prolonged to another side principal surface 2b of the base 2.
[0028]The feed electrode 25 adjoins from the earth electrode 24 at inner direction slippage of the base 2 at the earth electrode 24, it is formed, one end has been arranged at about 23a1 open end of the radiation electrode 23 of the one side principal surface 2a of the base 2, and the other end is prolonged to another side principal surface 2b via the side 2e.
[0029]The frequency means for switching 26 consists of the switching electrode 27, the resistance 28 for chalk, the variable capacitance diode 29 as a variable capacity element, and the capacitor 30 for DC cut. Among these, the resistance 28, the variable capacitance diode 29, and the capacitor 30 consist of chips, respectively. Elements other than variable capacitance diode may be used as a variable capacity element.
[0030]Here, the switching electrode 27 consisted of the 1st switching electrode 27a and 2nd switching electrode 27b, among these one end of the 1st switching electrode 27a has been arranged in the approximately center of the one side principal surface 2a of the base 2, and the other end is prolonged to another side principal surface 2b via

the side 2e of the base 2. It is formed on extension of the 1st switching electrode 27a, the placed opposite of the one end is carried out to one end of the 1st switching electrode 27a, and the 2nd switching electrode 27b is connected to the 1st radiation electrode 23a in which the other end constitutes the radiation electrode 23. The resistance 28 has been arranged between the 1st switching electrode 27a that constitutes the switching electrode 27, and the 2nd switching electrode 27b, and has connected the 1st switching electrode 27a and 2nd switching electrode 27b. The variable capacitance diode 29 has been arranged between the open end 23a1 of the radiation electrode 23, and the end of the 1st earth electrode 24a that constitutes the earth electrode 24, and has connected the radiation electrode 23 and the earth electrode 24. The capacitor 30 has been arranged between the other end of the 1st radiation electrode 23a that constitutes the radiation electrode 23, and one end of the 2nd radiation electrode 23b, and has connected the 1st radiation electrode 23a and 2nd radiation electrode 23b.

[0031]It is mounted in a circuit wiring board, the 1st switching electrode 27a that constitutes the switching electrode 27 is connected to the voltage control mechanism of a set side, and especially the surface mounted type antenna 21 constituted in this way is used, although not illustrated.

[0032]Next, operation of the surface mounted type antenna 21 is explained using drawing 6.

[0033]In drawing 6, f is a high frequency signal source and the capacity which generates C6 between the open end 23a1 of the radiation electrode 23 and the feed electrode 25, and C7 are capacity generated between the open end 23a1 of the radiation electrode 23, and the earth electrode 24. VC is the variable capacity by the variable capacitance diode 29. R2 is resistance by the resistance 28, and C8 is the capacity by the capacitor for a bypass (not shown) formed on the circuit wiring board in which the surface mounted type antenna 21 is mounted. L4 is the inductance by the 1st radiation electrode 23a, and the inductance according [L5] to the 2nd radiation electrode 23b, and C9 is the capacity by the capacitor 30. And with the capacity C6, electromagnetic field coupling of the high frequency signal impressed to the feed electrode 25 from the high frequency signal source f is carried out to the radiation electrode 23, it serves as an electric wave, and is emitted.

[0034]Here, the capacity by the variable capacitance diode 29 fluctuates by impressing voltage to the variable capacitance diode 29, and adjusting the value of this input voltage from the voltage control mechanism of a set side, via the switching electrode 27 which constitutes the frequency means for switching 26 of the surface mounted type antenna 21. Thus, two or more resonance frequency is realizable by changing the capacity component which specifies the resonance frequency of an antenna.

[0035]The shape of each electrode provided in the surface of the base 2, each electrode, and arrangement of each chip are not limited to what was shown in above-mentioned working example, unless these each inter-electrode one or the connecting relation of each electrode and each chip is changed. For example, as shown in drawing 7, while arranging the capacitor 30 on 2 f of sides of the base 2, each electrode may be made to extend on 2 f of sides. As shown in drawing 8, the end face 2c of the base 2 may be detoured, and the 1st radiation electrode 23a may be formed.

[Translation done.]

EXAMPLE

[Example]Hereafter, the dielectric filter of this invention is explained in full detail based on Drawings.
[0021]Drawing 1 is an appearance perspective view in the state where only the shielding case of the dielectric filter of the 1st invention was disassembled.
Drawing 2 is a top view of a capacitive coupling board.
A dielectric filter is explained that the filter part which joined two resonance means which are the combination of the easiest resonance means for an example about the surface mount type dielectric filter which concealed the filter part and the capacitive coupling board with the mount board and the shielding case is also.
[0022]In a figure, the surface mount type dielectric filter 10, The filter part 1 which comprises two or more resonators 1a and 1b, for example, two resonators, It comprises the mount board 3 which lays the capacitive coupling board 2 with which a connection capacity ingredient, an input-and-output capacity component, etc. for combining between each resonator 1a and 1b were formed, and the filter part 1 and the capacitive coupling board 2, the connecting pins 4a and 4b, and the shielding case 5.
[0023]The conductor (internal conductor 11) which laminated the resonators 1a and 1b of the filter part 1 on the internal surface of the breakthrough which penetrates the abbreviated center section of the block body which comprises the dielectric porcelain material for high frequency, and the conductor (outer conductor 12) laminated all over on the other hand removing the end face (open end face) side are formed. In order to shorten axial length of the resonators 1a and 1b, to simplify correction of resonance frequency about the structure of the resonators 1a and 1b, and to perform control of a zone, control of a joint degree, etc., various structures are proposed, but foundations are 1/4-wave type resonators.
[0024]As a modification mode of the filter part 1, two resonators can be formed by one dielectric block, or the slit and through hole for combination can also be formed in the meantime. When joining two or more resonators like working example, the connection groove for generating the connection capacity of both resonators can also be formed in the plane of composition.
[0025]The connecting pins 4a and 4b consist of copper, brass, iron, or those solder plate material, one end is connected to the internal conductor 11 of the resonators 1a and 1b, and the other end is connected to the capacity patterns 21a and 21b of the capacitive coupling board 2.
[0026]The capacity electrode patterns 21a, 21b, 22a, 22b, and 22c of specified shape are formed so that two or more capacity components may generate the capacitive coupling board 2.
[0027]As shown in drawing 2, specifically, the 1st two capacity electrode pattern 21a and 21b is formed in the principal surface by the side of the surface of the dielectric substrate 20 which comprises alumina, barium titanate, etc. of a predetermined dielectric constant. This 1st two capacity electrode pattern 21a and 21b is near the center section of the substrate 20, and the ctenidium polar zone 210a and 210b which gears mutually is formed. Capacity component C_3 for carrying out capacitive coupling of the resonators 1a and 1b occurs by these ctenidium polar zone 210a and 210b that gears mutually. These two capacity electrode patterns 21a and 21b act as an electrode for connecting via the internal conductor 11 and the connecting pins 4a and 4b of each resonators 1a and 1b.
[0028]As the dotted line of drawing 2 shows, the 2nd two capacity electrode pattern 22a and 22b and the 3rd one capacity electrode pattern 22c are formed in the principal surface by the side of the rear face of the dielectric substrate 20. This 2nd two capacity electrode pattern 22a and 22b is arranged so that it may have a predetermined opposing area and may counter in the rectangular shape part of the 1st capacity electrode pattern 21a and 21b. Thereby, according to the thickness of the dielectric substrate 20, the dielectric constant of the substrate 20, and an opposing area, predetermined input capacitance ingredient C_1 occurs between the 1st capacity electrode pattern 21a and the 2nd capacity electrode pattern 22a. According to the thickness of the dielectric substrate 20, the dielectric constant of the substrate 20, and an opposing area, prescribed output capacity component C_2 occurs similarly between the 1st capacity electrode pattern 21b and the 2nd capacity electrode pattern 22b.
[0029]Including the ctenidium polar zone 210a and 210b with which the 1st two capacity pattern 21a and 21b gears mutually, the 3rd capacity electrode pattern 22c is arranged so that it may counter with a predetermined opposing area by the ctenidium polar zone 210a and 210b at least. By this between the ctenidium polar zone 210a of the 1st

capacity electrode pattern 21a, and the 3rd capacity electrode pattern 22c, Prescribed capacity ingredient C_4 occurs, and prescribed capacity ingredient C_5 occurs similarly between the ctenidium polar zone 210b of the 1st capacity electrode pattern 21b, and the 3rd capacity electrode pattern 22c.

[0030]When increasing the number of the resonance means to join and performing capacity combination of resonators other than an adjoining resonator, the number of the capacity electrode patterns on the capacitive coupling board 2 may be increased.

[0031]The mount board 3 consists of an insulating material which has heat resistance, for example, a galla EPO board, an alumina ceramic substrate, etc., and the 1st ground conductor film 31, the 2nd ground conductor 32, and the terminal electrode pads 34 and 35 for input and output are formed in the surface side principal surface, respectively.

[0032]The 1st ground conductor film 31 is widely formed in the field in which the filter part 1 is carried, and is joined to the outer conductor 12 of the resonators 1a and 1b electrically and mechanically. moreover — the 2nd ground conductor film 32 is formed at the tip by the side of opening of the mount board 3 at island shape — the tongue 5a of the shielding case 5 — it joins to ,, electrically and mechanically.

[0033]Although it does not appear in drawing 1, the ground conductor film is formed in the rear face of the mount board 3.

The ground conductor of this rear face is formed in the position corresponding to the 1st ground conductor 31 by the side of the surface, and the 2nd ground conductor 32, It has extended in the longitudinal direction (direction prolonged in the short circuit end face side from the open end face side) of the mount board 3 so that the conductors formed in the position corresponding to the 1st ground conductor 31 and the 2nd ground conductor 32 may be connected.

[0034]furthermore — the edge of the 1st ground conductor 31 and the 2nd ground conductor 32, i.e., the end face of the mount board 3, -- the flow through hole 33 of semicircle shape ... is formed — this flow through hole 33 — via ..., The 1st ground conductor 31 by the side of the surface, and the 2nd ground conductor 32 and the ground conductor by the side of a rear face are electrically connected. therefore — although the 1st ground conductor 31 and 2nd ground conductor 32 are separately formed in the surface side of the mount board 3 — actual — the flow through hole 33 — it will electrically be connected via the ground conductor by the side of .. and a rear face.

[0035]The terminal electrode pads 34 and 35 for input and output are formed in the position connected to the 2nd capacity electrode pattern 22a and 22b formed in the rear face of the capacitive coupling board 2 of the field in which the capacitive coupling board 2 is carried, and they are formed so that it may extend on the side of the mount board 3.

[0036]moreover — the terminal electrode for input and output is formed also in the rear face of the mount board 3 at the position corresponding to the terminal electrode pads 34 and 35 for input and output by the side of the surface — the edge 36 of the mount board 3, i.e., the flow through hole of the semicircle shape of the end face of the mount board 3, — it is mutually connected by ...

[0037]the ground conductor film and the terminal electrode for input and output which were formed in the rear face of the mount board 3 here — the end face through hole 33, ..., 36 — it is used when carrying out a surface mount on a printed-circuit board with ..

[0038]The shielding case 5 consists of metal, such as brass, iron, or those solder plate material, and has structure in which the side by the side of the bottom and a short circuit end face carried out the opening so that the filter part 1 and the capacitive coupling board 2 might be covered. the tongue 5a bent 90 degrees by the side attachment wall by the side of the open end face of the shielding case 5 .. is formed, on a side attachment wall corresponding near the capacitive coupling board 2 of the shielding case 5, it cuts deeply, and 5b is formed. This shielding case 5 covers the filter part 1 and the capacitive coupling board 2, and it is being arranged and fixed so that that opening periphery may contact the surface of the mount board 3.

[0039]here -- the tongue 5a .. is for joining to the 2nd ground conductor film 32 formed in the surface of the mount board 3 electrically and mechanically.

It is for the slitting 5b preventing the short circuit by contact with the terminal electrode pads 34 and 35 for input

and output, and the shielding case 5.

[0040]The inner surface by the side of the short circuit end face of the shielding case 5 immobilization of the shielding case 5 via conductive binders, such as solder, to the outer conductor 12 of the filter part 1, It is attained by fixing the tongue 5a at the tip by the side of the open end face of the shielding case 5 to the 2nd ground conductor 32 of the surface of the mount board 3 via conductive binders, such as solder.
[0041]The assembly of the dielectric filter which comprises above each component parts, First, the filter part 1 and the capacitive coupling board 2 are joined to the surface of the mount board 3 with the high temperature solder 37 etc., The internal conductor 11 of each resonance means 1a and 1b and the capacity electrode patterns 21a and 21b of the joined substrate 2 which constitute the filter part 1 are connected, further, the shielding case 5 is arranged to the mount board 3 so that the filter part 1 and the capacitive coupling board 2 may cover, and they are assembly ****.
[0042]Here, the 1st capacity electrode pattern 21a and 21b is formed in the surface side, and, as for the capacitive coupling board 2 used for the dielectric filter of this invention, the 2nd capacity electrode pattern 22a and 22b and the 3rd capacity electrode pattern 22c are formed in the rear-face side. Here, when the 3rd capacity electrode pattern 22c fully separates from the 2nd capacity electrode pattern 22a and 22b and forms, to the 3rd capacity electrode pattern 22c, two capacity component C_4 and C_5 will occur between the 1st capacity electrode pattern 21a and 21b. This capacity component C_4 and C_5 will be connected with capacity component C_3 which it is mutually connected in in-series, and is generated between the ctenidium polar zone 210a of the 1st capacity electrode pattern 21a and 21b, and 210b in parallel. That is, these capacity component C_3, C_4, and C_5 are compounded, and it becomes the synthetic connection capacity C for actually combining between the upper resonator 1a and 1b.
[0043]For example, input capacitance ingredient C_1 will occur to the 1st capacity electrode pattern 21a and the 2nd capacity electrode pattern 22a, and for example, output-capacitance ingredient C_2 will occur to the 1st capacity electrode pattern 21b and the 2nd capacity electrode pattern 22b.
[0044]By change of the thickness of the substrate of the dielectric substrate 20 of the capacitive coupling board 2, although each of these synthetic connection capacity ingredients C and input-and-output capacity component C_1, and C_2 also changes that capacity component by change of a dielectric constant again, change of the capacity component C and C_1, and C_2 serves as positive correlation mutually. For example, if the thickness of the dielectric substrate 20 becomes thicker than a predetermined value, there is no change substantially [/ capacity component C_3], capacity component C_4 and C_5 decrease, a result and a synthetic connection capacity ingredient will decrease and input-and-output capacity component C_1 and C_2 will also decrease.

[0045]If the thickness of the dielectric substrate 20 becomes thinner than a predetermined value for example, there is no change substantially [/ capacity component C_3], capacity component C_4 and C_5 increase, a result and a synthetic connection capacity ingredient will increase and input-and-output capacity component C_1 and C_2 will also increase them.

[0046]Therefore, change of balance with a synthetic connection capacity ingredient and input-and-output capacity can lessen dramatically change of few fundamental filter characteristics, for example, a zone etc., by change of the dielectric substrate 20.
[0047]By this, the capacitive coupling board 2 and the dielectric filter 10 whose characteristic was comparatively stable also by especially BATSURAKI of the dielectric substrate 20 will be attained.
[0048]Although the 3rd capacity electrode pattern 22c formed in the rear face of the capacitive coupling board 2 was in the state where it fully separated from the 2nd capacity electrode pattern 22a and 22b, the above dielectric filter, This 3rd capacity electrode pattern 22c The 2nd capacity electrode pattern 22a, The 2nd invention arranged so that 22b is approached, and a part of 2nd capacity electrode pattern 22a may counter the ctenidium polar zone 210b of the 1st capacity electrode pattern 21b and a part of 2nd capacity electrode

pattern 22b may counter the ctenidium polar zone 210a of the 1st capacity electrode pattern 21a is explained.

[0049]Drawing 3 is a top view of the capacitive coupling board used for the dielectric filter of the 2nd invention.

[0050]A dotted-line portion shows the capacity electrode pattern by the side of a rear face among a figure.

[0051]In the figure, the 1st two capacity electrode pattern 21a and 21b that connects with the internal conductors 11 and 11 of the resonance means 1a and 1b, and has the ctenidium polar zone 210a and 210b is formed in the surface of the capacitive coupling board 2. The 2nd capacity electrode pattern 23a and 23b is formed in the rear face of the capacitive coupling board 2 at the position which counters the 1st capacity electrode pattern 21a and 21b linked to the resonance means for input and output. The 3rd capacity electrode pattern 23c is formed in the position corresponding to the ctenidium polar zone 210a and 220b of said 1st capacity electrode pattern 21a and 21b that gets into gear mutually.

[0052]The characteristic thing of the 2nd invention is that the 2nd capacity electrode pattern 23a by the side of a rear face has countered other 1st capacity electrode pattern 21b by the side of the surface in addition to 1st capacity electrode pattern 21a by the side of said surface which counters, for example, generates input capacitance ingredient C_1, for example. That is, the 2nd capacity electrode pattern 23a has also countered the ctenidium polar zone 210b of other 1st capacity electrode pattern 21b. Similarly, the 2nd capacity electrode pattern 23b is having countered other 1st capacity electrode pattern 21a by the side of the surface in addition to 1st capacity electrode pattern 21b by the side of said surface which counters, for example, generates output-capacitance ingredient C_2. That is, the 2nd capacity electrode pattern 23b has also countered the ctenidium polar zone 210a of other 1st capacity electrode pattern 21a.

[0053]For example, input capacitance ingredient C_1 occurs like the 1st invention by this in the thickness direction of the dielectric substrate 20 of the 1st capacity electrode pattern 21a and the 2nd capacity electrode pattern 23a. For example, output-capacitance ingredient C_2 occurs in the thickness direction of the dielectric substrate 20 of the 1st capacity electrode pattern 21b and the 2nd capacity electrode pattern 23b.

[0054]The ctenidium polar zone 210a with which the 1st capacity electrode pattern 21a and 21b gears mutually, Connection capacity ingredient C_3 occurs in 210b, and for example, capacity component C_4 occurs further in the thickness direction of the dielectric substrate 20 with the ctenidium polar zone 210a of the 3rd capacity electrode pattern 23c and the 1st capacity electrode pattern 21a. For example, capacity component C_5 occurs, and can obtain the compounded connection capacity C in the thickness direction of the dielectric substrate 20 with the ctenidium polar zone 210b of the 3rd capacity electrode pattern 23c and the 1st capacity electrode pattern 21b.

[0055]Especially in the 2nd invention, for example, capacity component C_6 occurs in the thickness direction of the dielectric substrate 20 of the ctenidium polar zone 210a of the 1st capacity electrode pattern 21a, and the 2nd capacity electrode pattern 23b, For example, capacity component C_7 occurs in the thickness direction of the dielectric substrate 20 of the ctenidium polar zone 210b of the 1st capacity electrode pattern 21b, and the 2nd capacity electrode pattern 23a. Capacity component C_8 will occur between the 2nd capacity electrode pattern 23a and the 3rd capacity electrode pattern 23c, and capacity component C_9 will occur between the 2nd capacity electrode pattern 23b and the 3rd capacity electrode pattern 23c.

[0056]If above-mentioned each capacity component C_1 ~ C_9 are expressed including the two resonance means 1a and 1b, it will become like drawing 4. The characteristic of the dielectric filter constituted in this way is shown like drawing 5. That is, the two attenuation poles A and B occur like drawing 5 in the field where frequency is comparatively low.

[0057]. As a result of this invention person's conducting various experiments, make small capacity component C_8 and C_7. Namely, the

opposing area of the ctenidium polar zone 210a of the 1st capacity electrode pattern 21a and the 2nd capacity electrode pattern 23b is decreased, And when the opposing area of the ctenidium polar zone 210b of the 1st capacity electrode pattern 21b and the 2nd capacity electrode pattern 23a is decreased, the attenuation pole A can be controlled, for example, it can be made to move to a side with low frequency.

[0058]Make small capacity component C_8 and C_9, namely, the interval of the 2nd capacity electrode pattern 23a and the 3rd capacity electrode pattern 23c is enlarged, And when the interval of the 2nd capacity electrode pattern 23b and the 3rd capacity electrode pattern 23c is enlarged, the attenuation pole B can be controlled, for example, it can be made to move to a side with low frequency.

[0059]What is necessary is just to enlarge each capacity component $C_6 - C_9$, in order to move both the attenuation poles A and B to the high region side of frequency.

[0060]For example, in order to enlarge capacity component C_6 and C_7, the number of ctenidiums of the ctenidium polar zone 210a and 210b of the 1st capacity electrode pattern 21a and 21b is made to increase, and an opposing area with the 2nd capacity electrode pattern 23a and 23b is made large, for example.

[0061]What is necessary is to narrow the interval of the 2nd capacity electrode pattern 23a and 23b and the 3rd capacity electrode pattern 23c, or just to make the distance which counters increase, in order to enlarge capacity component C_8 and C_9.

[0062]As mentioned above, according to the 2nd invention, easily, two attenuation poles can be controlled only by changing each electrode pattern of the capacitive coupling board 2, and the dielectric filter of owner polarization can be attained with very easy composition by it.

[0063]also in this 2nd invention, although some attenuation pole frequency is changed by the variation in the dielectric substrate 20, it is the fundamental characteristic — a zone — change serves as few dielectric filters.

[0064]Although the filter part which comprises two resonators was used in above-mentioned working example, In the mount board 3 which can change the number of resonators arbitrarily, and consists combination between resonators of dielectric materials although the capacitive coupling board 2 was used, each capacity electrode pattern equivalent to the capacitive coupling board 2 is formed in the mount board 3, and the capacitive coupling board 2 can be omitted.

[0065]Even if it forms the filter part which comprises the resonator of join plurality by a single dielectric block, a style trap is carried out, and it does not matter even if it uses lamination type dielectric filter parts, such as the Tori plate form.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a fluoroscopy perspective view showing the surface mounted type antenna concerning the 1st working example of this invention.
[Drawing 2]It is a representative circuit schematic of the surface mounted type antenna of drawing 1.
[Drawing 3]It is an important section perspective view showing the modification of the surface mounted type antenna of drawing 1.
[Drawing 4]It is an important section perspective view showing other modifications of the surface mounted type antenna of drawing 1.
[Drawing 5]It is a fluoroscopy perspective view showing the surface mounted type antenna concerning the 2nd working example of this invention.
[Drawing 6]It is a representative circuit schematic of the surface mounted type antenna of drawing 5.
[Drawing 7]It is a perspective view showing the modification of the surface mounted type antenna of drawing 5.
[Drawing 8]It is an important section perspective view showing other modifications of the surface mounted type antenna of drawing 5.
[Drawing 9]It is a fluoroscopy perspective view showing the conventional surface mounted type antenna.
[Drawing 10]It is a representative circuit schematic of the surface mounted type antenna of drawing 9.
[Description of Notations]
1, 21 surface mounted type antennas
2 Base
2a On the other hand, it is the principal surface.
2b Another side principal surface
3 and 23 Radiation electrode
3a The 1st track
3b The 2nd track
3c The 3rd track
Three a1 and 23a1 Open end
4 and 24 Earth electrode
24a The 1st earth electrode
24b The 2nd earth electrode
5 and 25 Feed electrode
6 and 26 Frequency means for switching
7 and 27 Switching electrode
9 Diode (semiconductor device)
29 Variable capacitance diode (variable capacity element)

[Translation done.]

* NOTICES *

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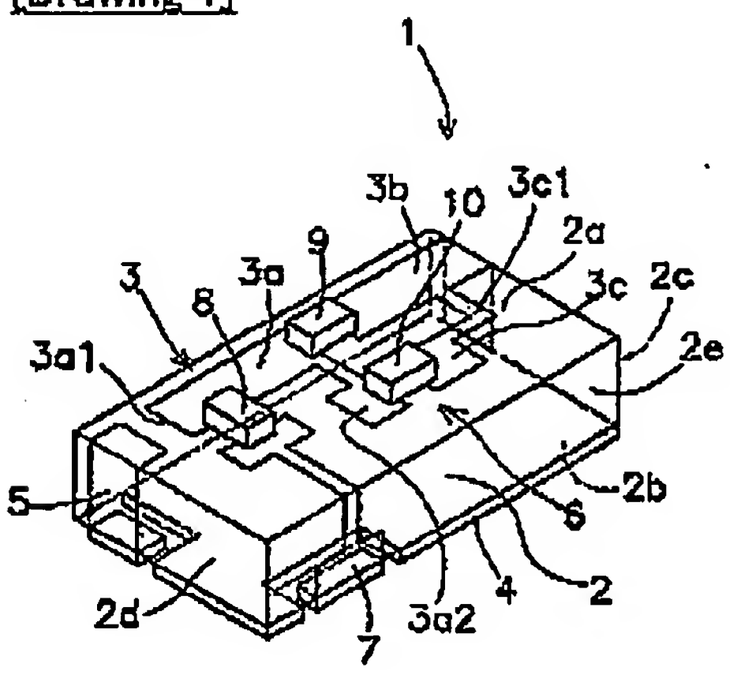
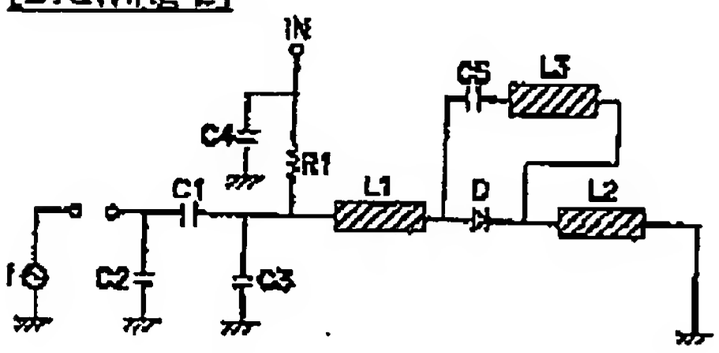
DRAWINGS

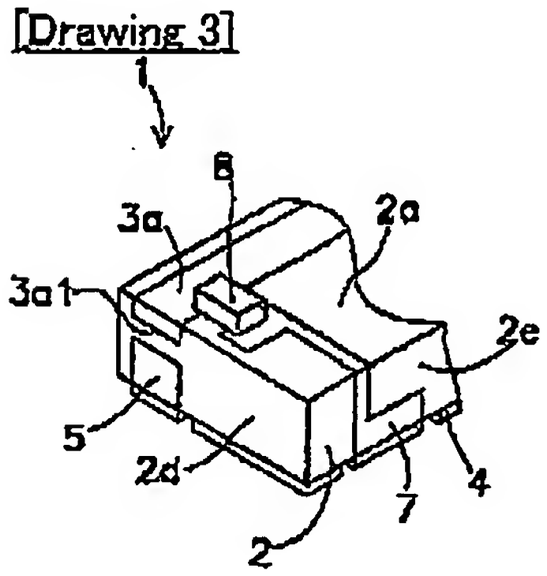
[Drawing 1]



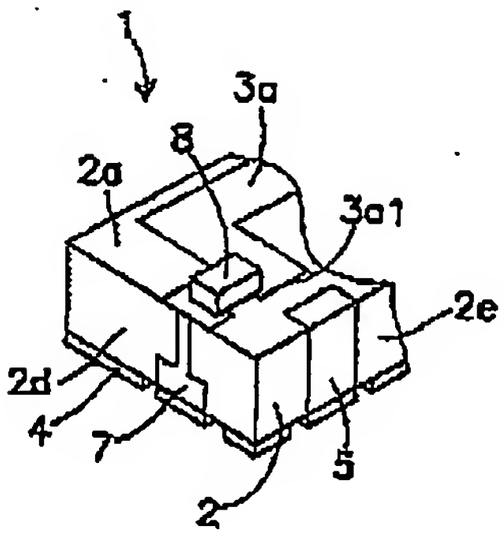
[Drawing 2]



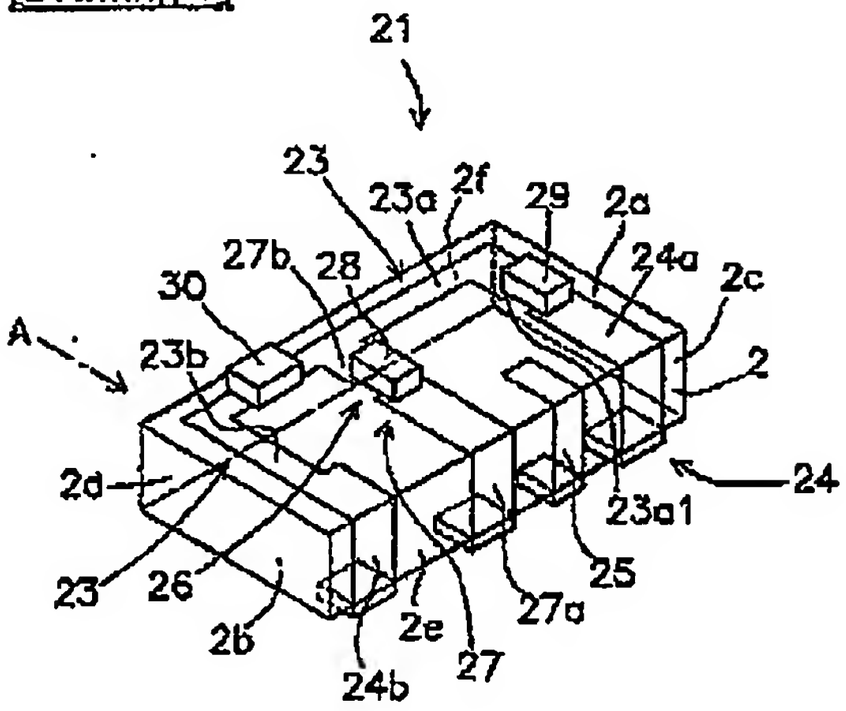
[Drawing 3]



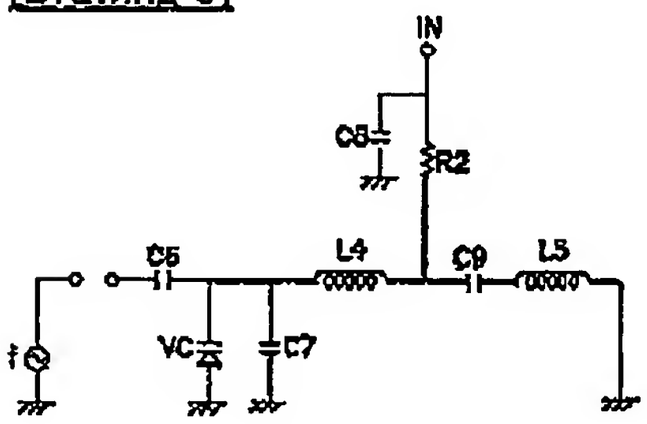
[Drawing 4]



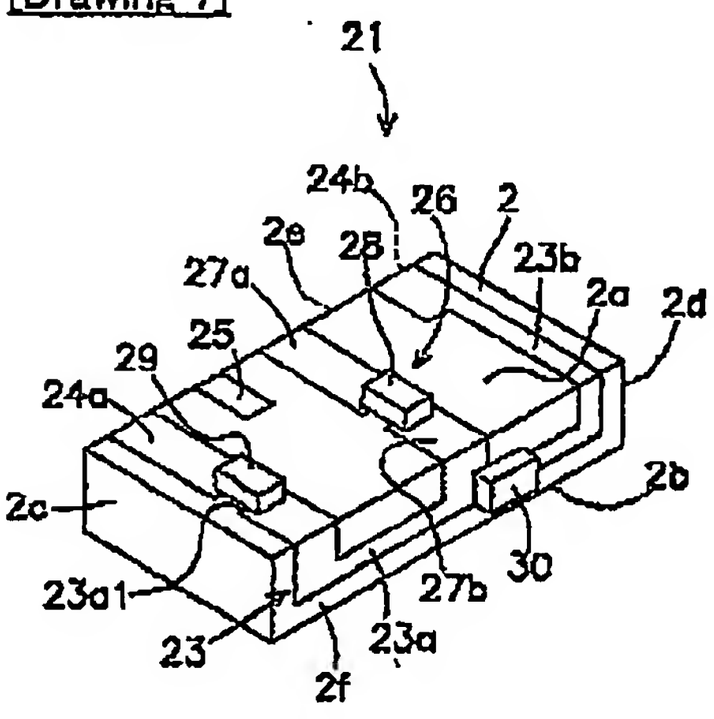
[Drawing 5]



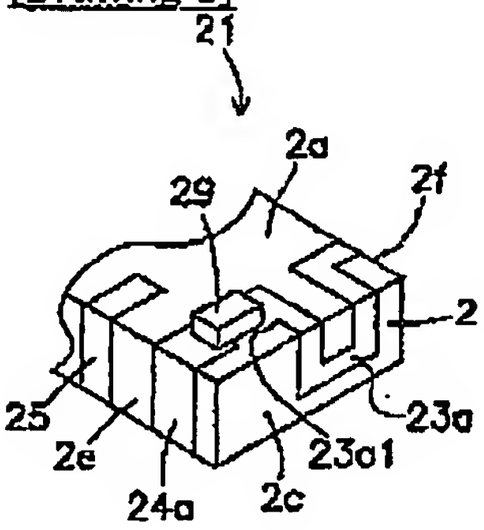
[Drawing 6]



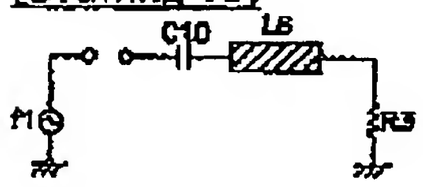
[Drawing 7]



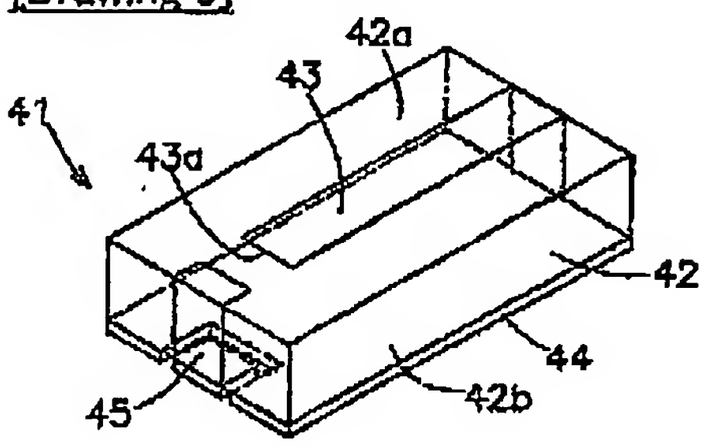
[Drawing 8]



[Drawing 10]



[Drawing 9]



[Translation done.]